Where C is 1.4 for 2,400 volt systems or 3.0 for 4,160 volt systems, I_{sc} is the 3-phase short circuit current in amperes of the system, t is the clearing time in seconds of the outby circuit-interrupting device and d is the thickness in inches of the metal wall/cover adjacent to an area of potential arcing.

(2) The minimum free distance must be increased by 1.5 inches for 4,160 volt systems and 0.7 inches for 2,400 volt systems when the adjacent wall area is the top of the enclosure. If a steel shield is mounted in conjunction with an aluminum wall or cover, the thickness of the steel shield is used to determine the minimum free distances.

(p) The following static pressure test must be performed on each prototype design of explosion-proof enclosures containing high-voltage switchgear prior to the explosion tests. The static pressure test must also be performed on every explosion-proof enclosure containing high-voltage switchgear, at the time of manufacture, unless the manufacturer uses an MSHA accepted quality assurance procedure covering inspection of the enclosure. Procedures must include a detailed check of parts against the drawings to determine that the parts and the drawings coincide and that the minimum requirements stated in part 18 have been followed with respect to materials, dimensions, configuration and workmanship.

(1) *Test procedure.* (i) The enclosure must be internally pressurized to at least the design pressure, maintaining the pressure for a minimum of 10 seconds.

(ii) Following the pressure hold, the pressure must be removed and the pressurizing agent removed from the enclosure.

(2) *Acceptable performance.* (i) The enclosure during pressurization must not exhibit—

(A) Leakage through welds or casting; or

(B) Rupture of any part that affects the explosion-proof integrity of the enclosure.

(ii) The enclosure following removal of the pressurizing agents must not exhibit—

(A) Visible cracks in welds;

(B) Permanent deformation exceeding 0.040 inches per linear foot; or

(C) Excessive clearances along flame-arresting paths following retightening of fastenings, as necessary.

[67 FR 10999, Mar. 11, 2002; 69 FR 68078, Nov. 23, 2004; 69 FR 70752, Dec. 7, 2004]

Subpart C—Inspections and Tests

§ 18.60 Detailed inspection of components.

An inspection of each electrical component shall include the following:

(a) A detailed check of parts against the drawings submitted by the applicant to determine that: (1) The parts and drawings coincide; and (2) the minimum requirements stated in this part have been met with respect to materials, dimensions, configuration, workmanship, and adequacy of drawings and specifications.

(b) Exact measurement of joints, journal bearings, and other flame-arresting paths.

(c) Examination for unnecessary through holes.

(d) Examination for adequacy of lead-entrance design and construction.

(e) Examination for adequacy of electrical insulation and clearances between live parts and between live parts and the enclosure.

(f) Examination for weaknesses in welds and flaws in castings.

(g) Examination for distortion of enclosures before tests.

(h) Examination for adequacy of fastenings, including size, spacing, security, and possibility of bottoming.

§ 18.61 Final inspection of complete machine.

(a) A completely assembled new machine or a substantially modified design of a previously approved one shall be inspected by a qualified representative(s) of MSHA. When such inspection discloses any unsafe condition or any feature not in strict conformance with the requirements of this part it shall be corrected before an approval of the machine will be issued. A final inspection will be conducted at the site of manufacture, rebuilding, or other locations at the option of MSHA.

(b) Complete machines shall be inspected for:

(1) Compliance with the requirements of this part with respect to joints, lead

entrances, and other pertinent features.

(2) Wiring between components, adequacy of mechanical protection for cables, adequacy of clamping of cables, positioning of cables, particularly with respect to proximity to hydraulic components.

(3) Adequacy of protection against damage to headlights, push buttons, and any other vulnerable component.

(4) Settings of overload- and short-circuit protective devices.

(5) Adequacy of means for connecting and protecting portable cable.

§ 18.62 Tests to determine explosion-proof characteristics.

(a) In testing for explosion-proof characteristics of an enclosure, it shall be filled and surrounded with various explosive mixtures of natural gas and air. The explosive mixture within the enclosure will be ignited electrically and the explosion pressure developed therefrom recorded. The point of ignition within the enclosure will be varied. Motor armatures and/or rotors will be stationary in some tests and revolving in others. Coal dust having a minimum of 22 percent dry volatile matter and a minimum heat constant of 11,000 moist BTU (coal containing natural bed moisture but not visible surface water) ground to a fineness of minus 200 mesh U.S. Standard sieve series. At MSHA's discretion dummies may be substituted for internal electrical components during some of the tests. Not less than 16 explosion tests shall be conducted; however, the nature of the enclosure and the results obtained during the tests will determine whether additional tests shall be made.

(b) Explosion tests of an enclosure shall not result in:

(1) Discharge of flame.

(2) Ignition of an explosive mixture surrounding the enclosure.

(3) Development of afterburning.

(4) Rupture of any part of the enclosure or any panel or divider within the enclosure.

(5) Permanent distortion of the enclosure exceeding 0.040 inch per linear foot.

(c) When a pressure exceeding 125 pounds per square inch (gage) is developed during explosion tests, MSHA reserves the right to reject an enclosure(s) unless (1) constructional changes are made that result in a reduction of pressure to 125 pounds per square inch (gage) or less, or (2) the enclosure withstands a dynamic pressure of twice the highest value recorded in the initial test.

[33 FR 4660, Mar. 19, 1968, as amended at 57 FR 61210, Dec. 23, 1992]

§ 18.63 [Reserved]

§ 18.65 Flame test of conveyor belting and hose.

(a) *Size of test specimen.* (1) Conveyor belting—four specimens each 6 inches long by ½-inch wide by belt thickness, two cut parallel to the warp and two parallel to the weft.

(2) Hose—four specimens each 6 inches long by ½-inch wide by thickness of the hose.

(b) *Flame-test apparatus.* The principal parts of the apparatus within and/or appended to a 21-inch cubical test gallery are:

(1) A support stand with a ring clamp and wire gauze.

(2) A Pittsburgh-Universal Bunsen-type burner (inside diameter of burner tube 11 mm.), or equivalent, mounted in a burner placement guide in such a manner that the burner may be placed beneath the test specimen, or pulled away from it by an external knob on the front panel of the test gallery.

(3) A variable-speed electric fan and an ASME flow nozzle (16–8½ inches reduction) to attain constant air velocities at any speed between 50–500 feet a minute.

(4) An electric timer or stopwatch to measure the duration of the tests.

(5) A mirror mounted inside the test gallery to permit a rear view of the test specimen through the viewing door.

(c) *Mounting of test specimen.* The specimen shall be clamped in a support with its free end centered 1 inch above the burner top. The longitudinal axis shall be horizontal and the transverse axis inclined at 45° to the horizontal. Under the test specimen shall be clamped a piece of 20-mesh iron-wire gauze, 5 inches square, in a horizontal position ¼–inch below the pulley cover edge of the specimen and with about